NOTES ON A CASE OF BLACKWATER FEVER

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(*Received for publication 27 November, 1922*)

The writing of this note has been prompted by some remarks of Professor Warrington Yorke (1922) in a critical review of recent work on the pathology of blackwater fever. These will be referred to later.

CLINICAL HISTORY

J. D. T., aged 28, suffered from no disease of importance until June, 1921, when he contracted malaria in West Africa. This was a slight attack. In February, 1922, he had a severe attack of malaria, with which he was invalided home. He arrived in England on March 20th, and remained comparatively well, taking a small dose of quinine daily, till April 10th. On that day he felt shivery, and went to bed after mid-day. In the evening he took 15 grains of quinine. Next morning (April 11th) he still felt out of sorts, and at 11 a.m. passed dark red urine. Similar urine was passed at 1 p.m. I saw him in the early evening of the same day, and he was admitted to Professor T. K. Monro's wards in the Western Infirmary of Glasgow a couple of hours later. He looked rather ill, with temperature 102·6°, headache, and some yellowness of the skin. The spleen was enlarged, and the blood-film showed a few subtertian malarial parasites. A condition of suppression of urine had apparently set in, for, though he had passed no urine for eight hours, there was no desire to micturate, and the bladder was not distended. A few cubic centimetres of blood were taken for examination, and then 1,800 c.c. of 1 per cent. saline was injected intravenously. This injection, together with three litres of fluid taken by the mouth during the night had the effect of re-establishing

the flow of urine, and within twelve hours he passed 2,200 c.c., coloured dark red. Throughout the rest of the illness the output of urine was good, the lowest recorded in any twenty-four hours being 1,100 c.c. (April 28th). Haemoglobinuria continued for four days, but by April 15th there was no reaction with guaiac. The patient, however, was becoming increasingly ill, and for two days (April 15th-17th) it looked as though he were going to die. He was delirious, anaemia was intense (Hb. 16 per cent. on April 16th), and there was remittent pyrexia which continued to range from 99° to 103° or 104° until April 18th. Thereafter the temperature did not exceed 100° except for twenty-four hours on April 21st-22nd, when it reached 102·4°. This coincided with a recurrence of haemoglobinuria for a similar period. It became normal on April 25th, and remained so during convalescence except for a rise on May 6th-8th from a relapse of malaria, during which a few subtertian rings were again found in the blood. He was dismissed hospital well on June 2nd.

Urine

The state of the urine is here shown:—

Date	Colour	Specific gravity	Guaiac test
April 11 ...	dark red	1018	+
,, 12 ...	,,	1015	+
,, 13 ...	dark amber	1020	+
,, 14 ...	amber	1020	−
,, 15-20 ...	,,	...	−
,, 21 ...	dark amber	1022	+
,, 22 ...	dark red	1025	+
,, 23 onwards	amber		−

The specimens of red urine had a copious brownish deposit, which showed brown casts under the microscope. No red corpuscles were seen, Spectroscopic examination showed the bands of oxy-haemoglobin.

Blood

The specimen of blood taken on admission to hospital was run into a dry tube and was allowed to clot. The serum which separated was dark red in colour. It was not matched with a standard, but was much darker than the tube of a Gowers'

haemoglobinometer. The spectrum was that of oxy-haemoglobin. The urea in this sample of serum was estimated, and was found to amount to 84 mgm. per 100 c.c. of blood. The method employed for the estimation was that described by Kennaway (1920), which depends on the power of an enzyme in the soya bean to break up urea quantitatively into ammonium carbonate, and briefly is as follows. The serum is treated with alcohol to remove the protein, and then is diluted with water. A few drops of a methyl red solution are added as an indicator, and the fluid is brought to a buff shade which corresponds to a constant acidity. A control flask containing water is brought to the same shade, that is, to the same reaction, and to each is added a watery extract of powdered soya bean. The flasks are incubated in a water-bath for an hour, and then by titration the difference in the acidities is ascertained. This difference is due to the production of ammonium carbonate in the serum, and the degree of alkalinity produced indicates the amount of urea originally present. Full details of the method will be found in the original paper. Normal blood gives a reading of 30 to 35 mgm. of urea per 100 c.c.

A few blood-counts were done:—

Date	Hb%	Red Cells	Leucocytes
April 16 ...	16	1·3 m.	14,000
„ 26 ...	30	1·9 m.	11,000
May 7 ...	52	3·5 m.	...
„ 15 ...	60	3·8 m.	...
„ 21 ...	76	4·2 m.	...

m = million.

A film taken when the anaemia was severe (April 17th) showed marked anisocytosis of red cells, with some megalocytes. Nucleated reds numbered five hundred per c.mm. A differential leucocyte count showed neutrophil polymorphs 77 per cent., lymphocytes 18 per cent., large hyalines 2 per cent., eosinophil polymorphs 3 per cent. Immature polymorphs were numerous. By May 21st the blood-film was practically normal.

Examination of thick films for malarial parasites showed:—

On April 11 ...	A few subtertian rings
„ 13 ...	No parasites
„ 15 ...	„ „
May 6 ...	A few subtertian rings
„ 21 ...	No parasites

Quinine

The following doses of quinine sulphate were given by the mouth :—

April 17	...	gr. 3
„ 18, 19	...	gr. 6 daily
May 6, 7	...	gr. 5 daily
„ 8 onwards		gr. 10 daily

REMARKS

A point of interest in this case is the occurrence of marked haemoglobinaemia on the day on which haemoglobinuria began. In the review referred to, in the first paragraph, Yorke writes: 'There is unfortunately astonishingly little in the way of precise information on this important point' [the presence of haemoglobinaemia], and he quotes from Christophers and Bentley: 'Examination of the blood in blackwater fever has shown without exception the presence of true haemoglobinaemia, demonstrated by the centrifuging of blood received into hypertonic citrate solution; the serum after clotting has also always shown haemoglobin . . . but in both cases the amount was usually small, and more or less masked by the extraordinarily intense yellow coloration of the serum.' In the case I have described the serum was dark red.

Yorke raises the question also as to whether Plehn is correct in stating that the urine in blackwater fever is of extraordinarily low specific gravity, and mentions numerous instances in favour of the opposite view. In the case of J. D. T., the four 24-hours' specimens of red urine showed a specific gravity of 1018, 1015, 1020, and 1025.

A further point of interest is the rise in the blood urea at the end of a quite short period of suppression of urine.

As regards treatment, it seems to me that in this case the injection of saline intravenously when failure of urinary secretion showed itself had much to do with the re-establishment of the flow. I have made this observation before (1918).

As has been pointed out to me by Professor C. H. Browning, there is a striking difference between the symptomatology of blackwater fever and that of paroxysmal haemoglobinuria. In the latter condition the patient may be disturbed hardly at all by an attack of haemoglobinuria, whereas in the former the disturbance is

profound. In the case I have described, it was noticeable that not only did the patient not improve with the cessation of haemoglobinuria, but he grew worse for two days, with continuation of the pyrexia, and for four days at least after the urine had become clear his condition was critical.

SUMMARY

A case of blackwater fever is described in which haemoglobinaemia was marked. The blood urea was found to be much increased after a short period of anuria.

REFERENCES

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